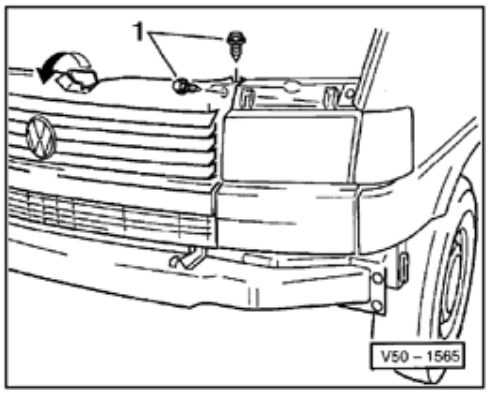
Engine, removing and installing

Special tools, testers and auxiliary items

- VAG 1921 Pliers for spring type clips
- 3227 Engine stand
- VAG 1383 A Engine/transmission jack
- 2024 A Lifting tackle
- VW 540 Engine bracket
- 3250 Support device
- G 000 100 grease
- VAG 1331 5 - 50 Nm (3.5 to 37 ft lb) Torque wrench
- VAG 1332 40 - 200 Nm (30 to 148 ft lb) Torque wrench
- Cable tie
- VAG 1306 Drip tray

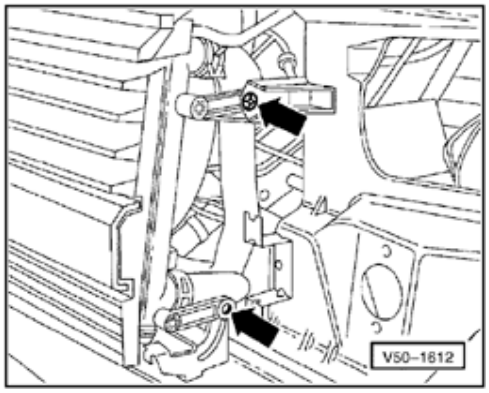
Engine removal notes

- *Remove the engine downward together with the transmission.*



- Unscrew left and right mounting screws -1-.
- Tilt lock carrier and radiator out and forward - arrow-.
- Pull radiator coolant hoses off engine using VAG 1921 hose clip pliers.
- Pull connectors off thermoswitch and radiator fan.

Vehicles ➢12.95



- Drive out left and right spreader clip pins - arrows- and unclip spreader clips from radiator bracket.

All vehicles

- Lift out radiator with fan, air guide and lock carrier.
- Unscrew speedometer drive at transmission.
- Unhook throttle cable from throttle body and support bracket.
- Remove mechanical clutch control cable (or hydraulic clutch slave cylinder)

⇒*Repair Manual, 5-Speed Manual Transmission, Repair Group 30*

Vehicles with manual transmission

- Disconnect selector mechanism from transmission.

⇒*Repair Manual, 5-Speed Manual Transmission, Repair Group 34*

Vehicles with Automatic transmission

- Remove selector lever cable from transmission:

	M10	60 Nm 44 ft lb
	M8	20 Nm 15 ft lb
Console to transmission	M10 x 60	65 Nm 48 ft lb
	M10 x 28	45 Nm 33 ft lb
Engine to transmission	M10	65 Nm 48 ft lb
Drive shaft to flanged shaft		55 Nm 41 ft lb

Vehicles with A/C, additional information

WARNING!

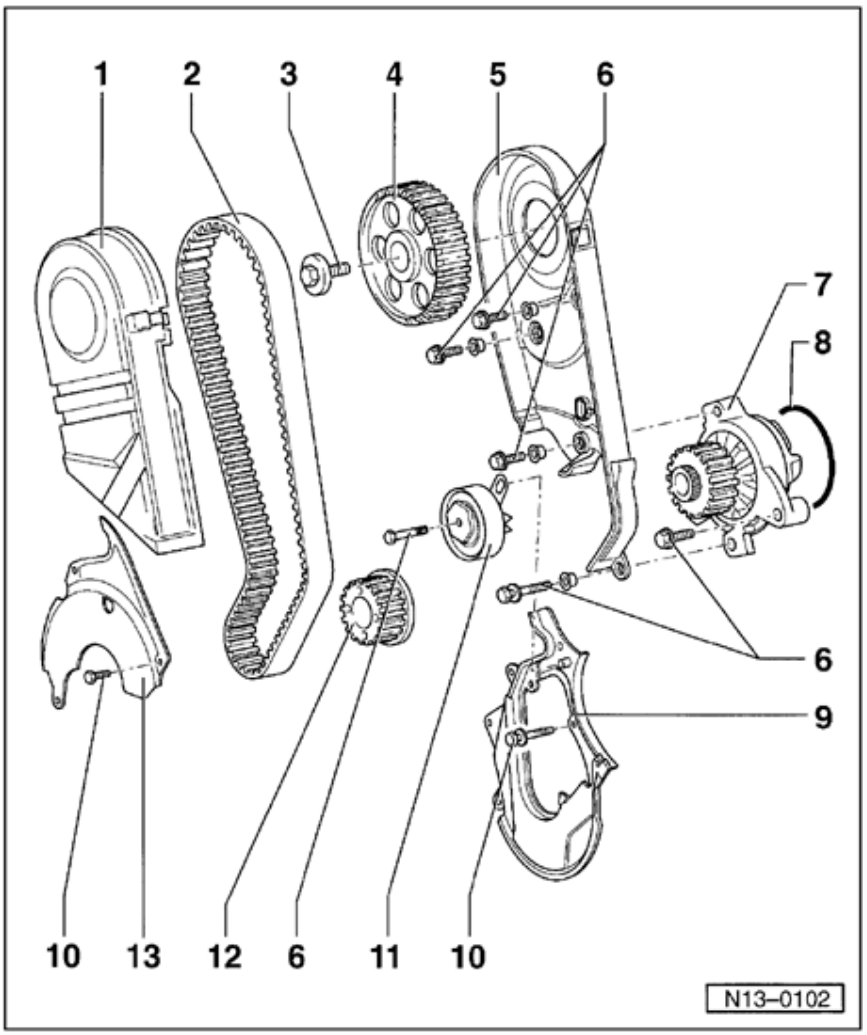
Do NOT open the A/C refrigerant circuit.

Note:

To prevent damage to the condenser and refrigerant lines/hoses, make sure that the lines and hoses are not stretched, kinked or bent.

To remove and install the engine without opening the refrigerant circuit:

- Remove A/C compressor and condenser and lay to one side so that the refrigerant lines/hoses are not stressed.



Part II, 08.95

1 - Front toothed belt guard, upper section

2 - Toothed belt

- Mark direction of rotation before removing
- Check for wear
- Do not kink
- Removing and installing ⇒Page 13-17

3 - Camshaft sprocket mounting bolt

- Observe steel type marking on bolt head:

  8.8 = 85 Nm (63 ft lb)

  10.9 = 100 Nm (74 ft lb)

- Loosen and tighten using 3036 counter-hold

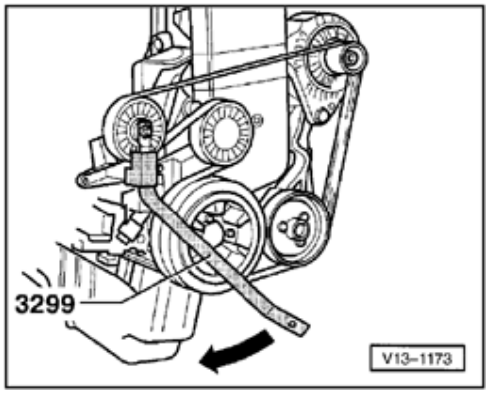
4 - Camshaft sprocket

- Note position when installing toothed belt ⇒ Page 13-17

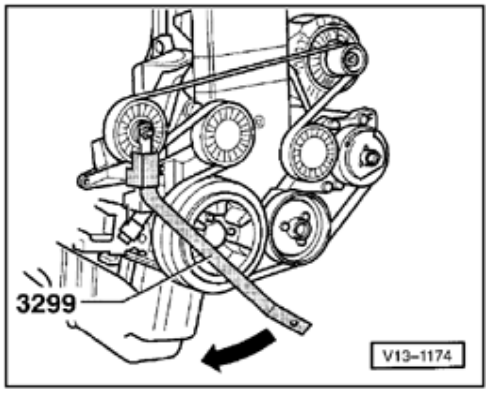
5 - Rear toothed belt guard, upper section

6 - 20 Nm (15 ft lb)

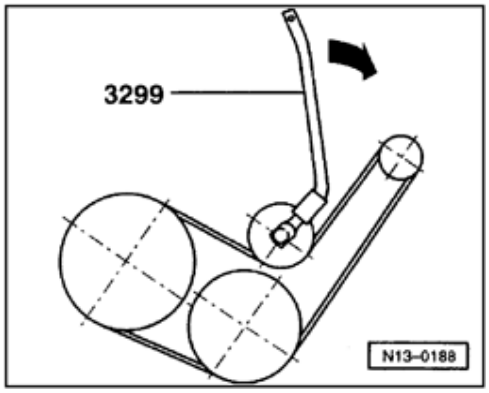
tension ribbed belt.



➢ Belt drive without A/C compressor



➢ Belt drive with A/C compressor



➢ Basic belt drive

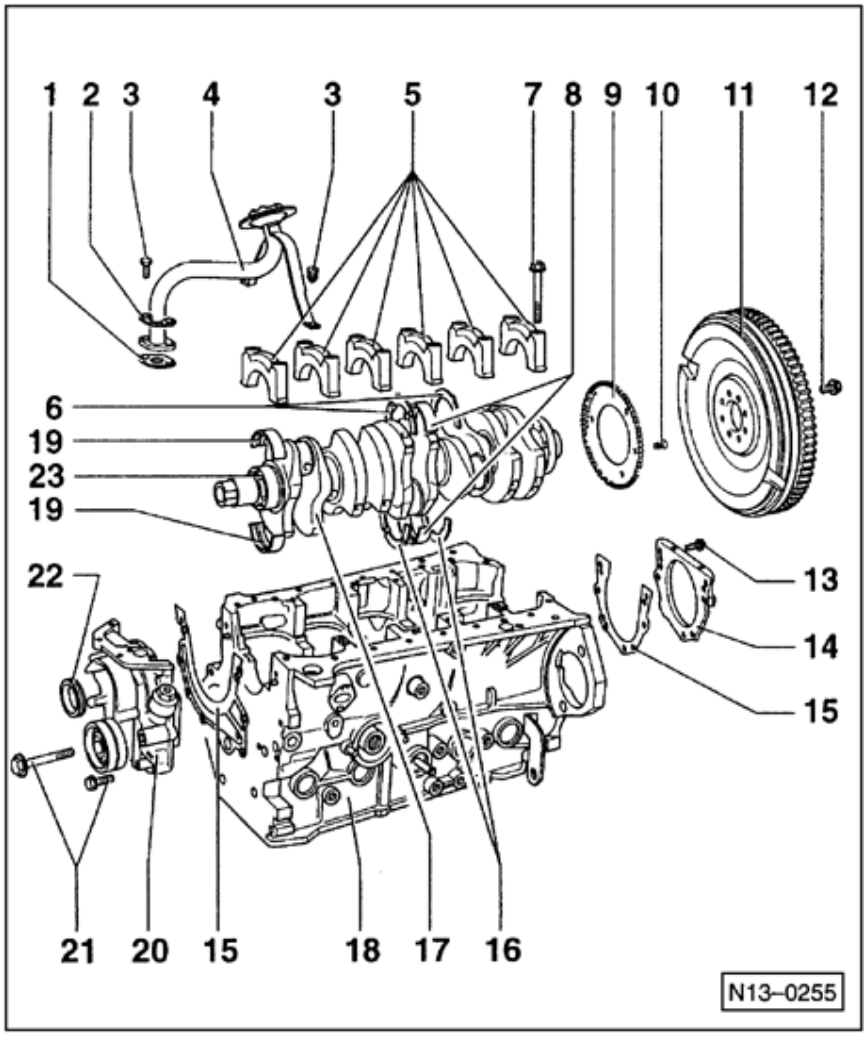
- Start engine and check belt running.

Toothed belt, removing and installing

Adjusting valve timing

Special tools, testers and auxiliary items

	48 ft lb
Drive shaft to flange shaft	55 Nm 41 ft lb
Transmission mount to sub-frame	45 Nm 33 ft lb
Tensioner device bracket and engine mount to cylinder block	40 Nm 30 ft lb



Crankshaft and flywheel assemblies, disassembling and assembling

Note:

For clutch repairs:

⇒*Repair Manual, 5 Spd. Manual Transmission 02B, Repair Group 30,*

1 - Gasket

- Always replace

2 - Securing plate

3 - 10 Nm (7 ft lb)

4 - Suction pipe

5 - Bearing cap

- Bearing cap 1: Pulley end
- Bearing cap 6: flywheel end
- Bearing shell retaining lugs cylinder

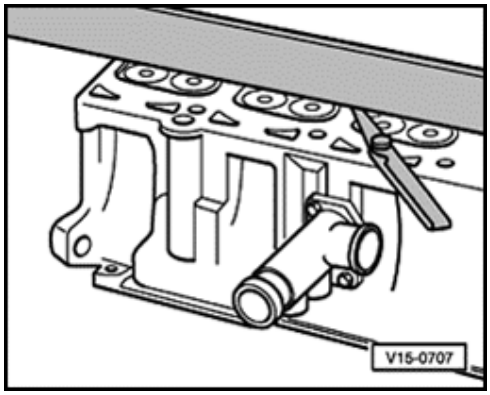


Fig. 1 Cylinder head, distortion checking

- Max. permissible distortion: 0.1 mm

Cylinder head, removing and installing

Special tools, testers and auxiliary items

- VAG 1332 Torque wrench, 40 to 200 Nm (30 to 148 ft lb)
- 3070 Guide pins
- Emery paper

Test conditions

- Engine cold
- Pistons NOT at TDC

Notes:

- *Remove the new cylinder head gasket from its packaging just before installing.*
- *Handle the new gasket with extreme care. Damage to the silicone coating in the beaded area will lead to leaks.*

Removing

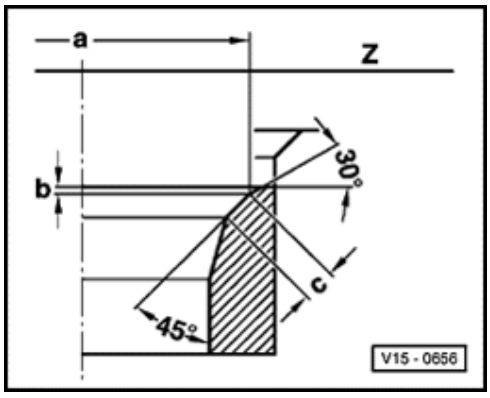
Measured distance minus minimum dimension = max. permissible working dimension.

Example:

	Measured distance -a-	35.1	mm
-	Minimum dimension	34.1	mm
=	max. perm. working dimension	0.7	mm

Note:

If the measured distance -a- is smaller than the minimum dimension, repeat measuring process with new valves and if necessary use shorter valves (valve length -c- ⇒Page 15-18 , Fig. ⇒4) or replace cylinder head.

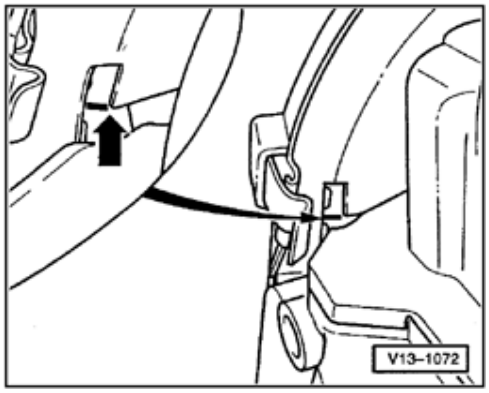


Intake valve seat, reworking

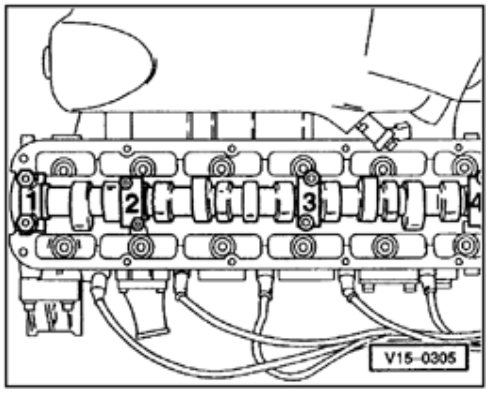
Dimension		Intake valve seat
diameter a	mm	37.2
diameter b	mm	max. permissible reworking dim.
c	mm	approx. 2.0 **)
Z		Cylinder head lower edge
45°		Valve seat angle
30°		Upper correction angle

**) if necessary rework valve seat with 75° correction reamer.

- Loosen camshaft sprocket (counter-hold with 3036).



- Set camshaft sprocket to TDC No. 1 cylinder by turning the crankshaft. Mark on camshaft sprocket must align with mark on rear toothed belt guard -arrow-.
- Release tensioning roller or coolant pump and take off toothed belt.
- Pull off camshaft sprocket.
- Remove woodruff key from camshaft.
- Remove distributor.



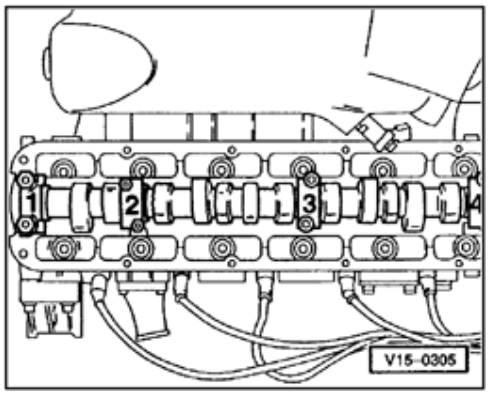
- First remove bearing caps 1 and 3. Loosen bearing caps 2 and 4 alternately and diagonally.

Installing

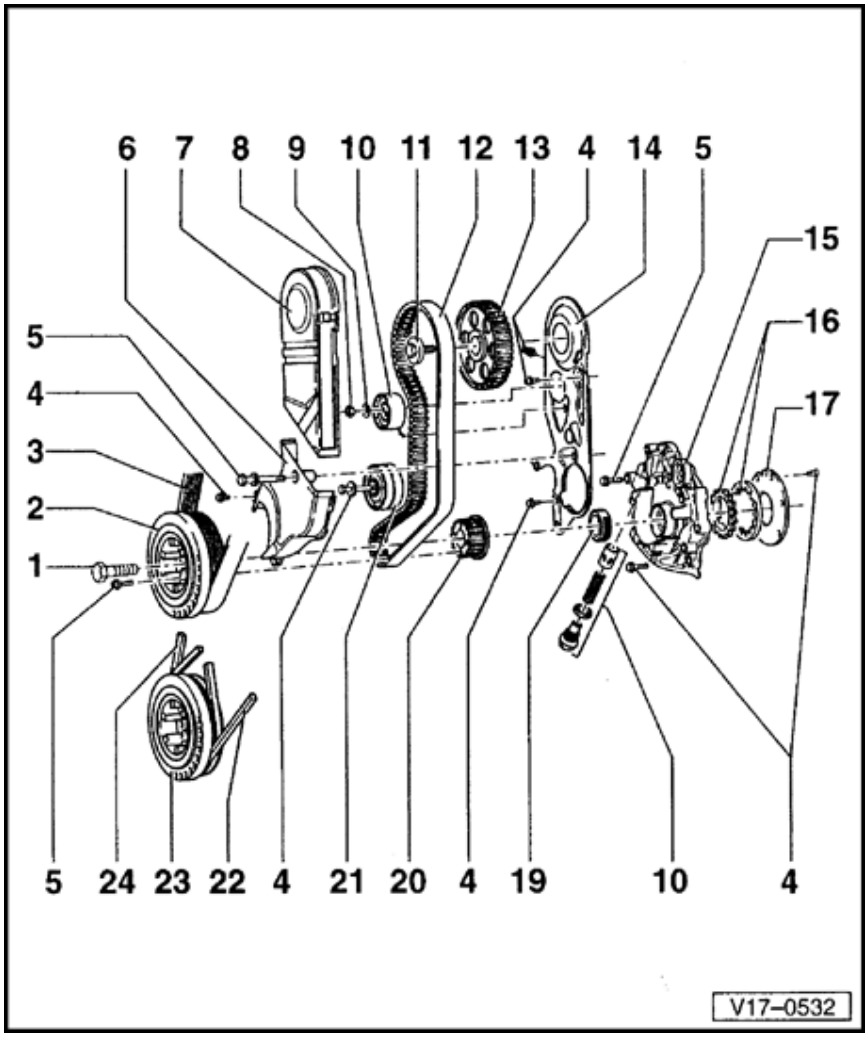
Notes:

- *When installing the camshaft No. 1 cylinder cams must point upward.*
- *When installing the bearing cap note offset, before installing camshaft install bearing caps and determine installation position.*

- Oil camshaft running surfaces.



- Tighten bearing caps 2 and 4 alternately and diagonally
  - 20 Nm (15 ft lb)
- Install bearing caps 1, 3 and 5 and tighten
  - 20 Nm (15 ft lb)
- Insert woodruff key in camshaft.



Part I

1 - Vibration damper center bolt

- Removing, installing and tensioning toothed belt ⇒ Page 13-17
- Loosen and tighten using 3419 counterhold ⇒Page 13-17

Screw length: 65 mm

- Coat threads and bolt head contact surface with sealing paste AMV 188 001 02
- Tightening torque 460 Nm (340 ft lb)

Screw length: 110 mm

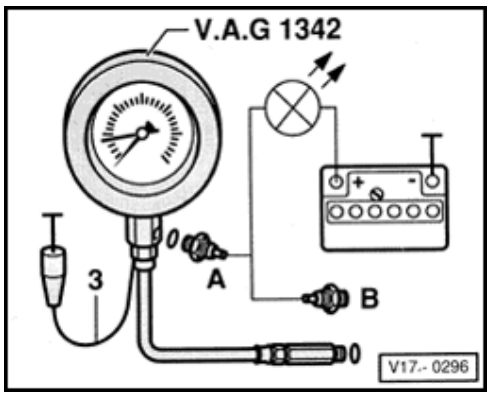
- Tightening torque 160 Nm (118 ft lb) + 1/2 turn (2 x 90 °) further
- 90 ° additional turn can be carried out in several stages.

2 - Vibration damper with ribbed V-belt pulley

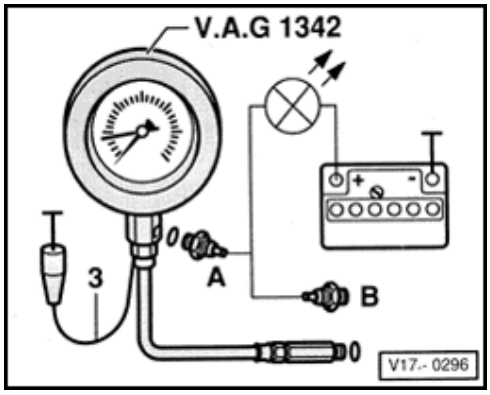
- 10.91
- Vibration damper and crankshaft toothed belt sprocket can only be installed in one position

⇒*Wiring diagrams, Electrical Wiring Diagrams, Troubleshooting &Component Locations*

Test sequence



- Remove 0.3 bar oil pressure switch (brown) or 0.25 bar oil pressure switch (blue) -F22- and screw into tester.
- Screw tester VAG 1342 into position for oil pressure switch in cylinder head.
- Connect brown wire -3- of tester to Ground (-).



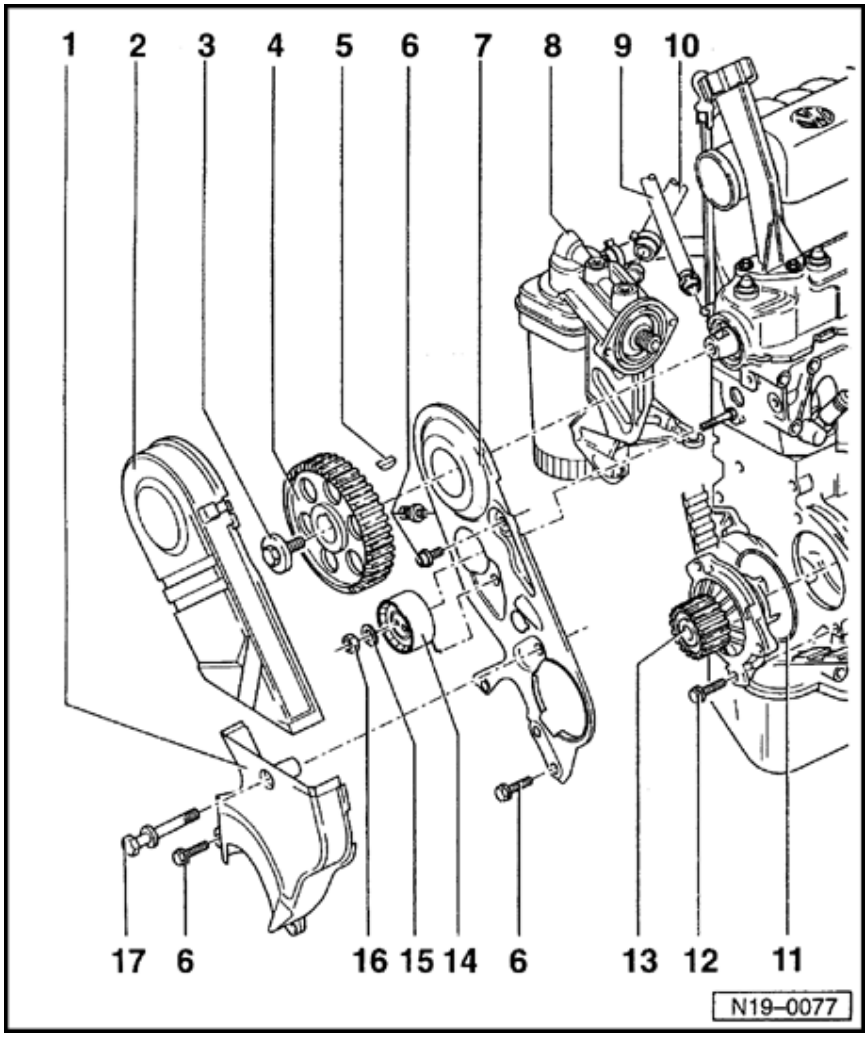
- Connect VAG 1527B LED tester between battery positive (+) and 0.3 bar or 0.25 bar oil pressure switch -F22- -A-
  - LED must light up
- Start engine and slowly increase engine speed
  - Brown switch: 0.15 to 0.45 bar

  Blue switch: 0.15 to 0.35 bar

  LED must go out, otherwise replace oil pressure switch
- Connect LED tester to (white) 1.8 bar oil pressure switch -F1- -B-
  - At 1.6 to 2.0 bar, LED must light up

If NO

- Replace oil pressure switch
- Increase engine speed further
  - At 2000 rpm and an oil temperature of 80 °C oil pressure must be 2.0 bar minimum



13 - Coolant pump

- Check shaft for ease of movement
- Replace complete if damaged or leaking
- ➢09.91 with elongated holes: to tension toothed belt: loosen slightly and turn with screwdriver ⇒ Page 13-17

14 - Tensioner

- 10.91➢
- Removing and installing ⇒Page 13-17

15 - Woodruff key

- with locking tab

16 - 15 Nm (11 ft lb)

17 - 20 Nm (15 ft lb)

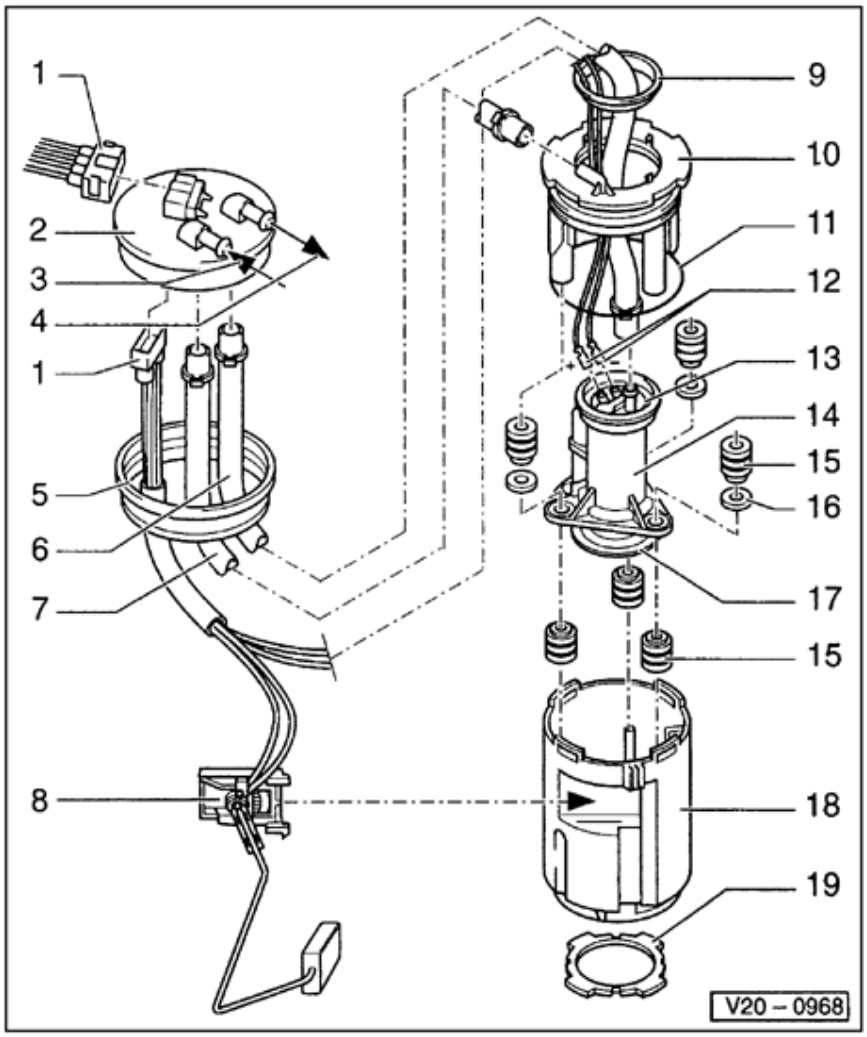
- Replace if damaged

6 - Supply hose

7 - Return hose

8 - Fuel gauge sensor

- Removing and installing ⇒Page 20-11



9 - Upper support ring

- Unclip with screwdriver

10 - Housing, upper section

- Unclip with screwdriver

11 - O-ring

- Coat with fuel when installing
- Replace if damaged

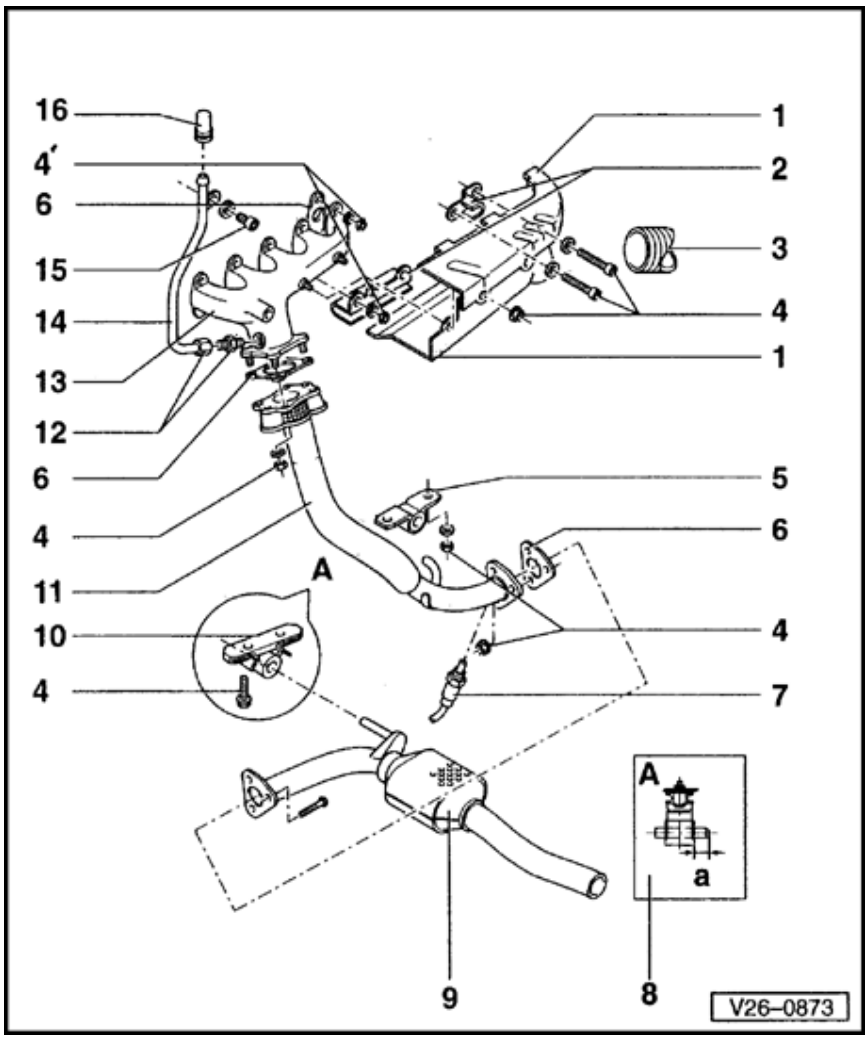
12 - Fuel pump connector

13 - Sealing ring, upper

- When installing pull into housing upper section - item. 10 -

14 - Fuel pump

- With strainer and non-return valve



10 - Mounting

11 - Front exhaust pipe

- 08.95 ➢twin pipe

12 - 30 Nm (22 ft lb)

13 - Exhaust manifold

- AAF engine:

  2 piece with intermediate and corrugated pipes

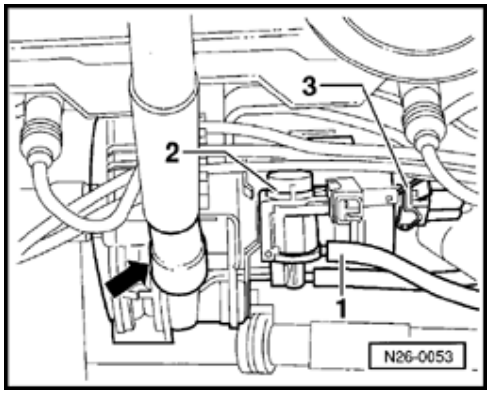
14 - CO sampling pipe

- ➢07.94
- Additionally secured to intake manifold

15 - 15 Nm (11 ft lb)

16 - Plug

- Make sure it is tight and leak free



- Replace Secondary Air Injection solenoid valve -2-.

If LED does not light up:

- Re-attach connector.
- Check valve activation

⇒*Repair Manual, Fuel Injection & Ignition, Repair Group 01*

If Valve operation is not perceptible during electrical check

- Check Secondary Air Injection pump relay - J299-

⇒*Wiring diagrams, Electrical Wiring Diagrams, Troubleshooting &Component Locations*

- Check and erase DTC memory

⇒*Repair Manual, Fuel Injection & Ignition, Repair Group 01; DTC memory, checking*